

REMARKS

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Claims 1-17 were pending in this application when examined. Non-elected claims 10-14 are withdrawn from consideration.

I. Claim Amendments

Claim 3 has been amended to recite a “single” layer of a polyglycolic acid resin. Support for this amendment can be found on in the Examples of the present specification. Thus, the claimed invention is directed to the solution of a problem specifically related to a container having a small volume (at most 700 ml) for which a maximum gas-barrier property is required.

Claims 2, 4 and 5 have been amended to depend from claim 3. Claim 4 has also been amended to delete “further”.

Claims 1, 9, 15 and 16 have been cancelled, without prejudice or disclaimer.

II. Claim Rejection Under 35 U.S.C. § 103

The Examiner rejects claims 1-9 and 15-17 under 35 U.S.C. § 103(a) as being unpatentable over Nakajima et al. (JP 2003-136657; US 2005/0011892). As applied to the amended claims, Applicants respectfully traverse the rejection.

The Examiner's Position

In item 3 on pages 2-4 and in item 12 on page 5 of the Office Action, the Examiner sets forth the basic arguments against the patentability of the claimed invention. Thus, the Examiner takes the position that discovering an optimum value of a result effective variable involves only routine skill in the art, and that it would have been obvious to adjust the volume of the container and the weight content of the polyglycolic acid resin (PGA) through routine experimentation to obtain a container of the desired size with the desired gas-barrier property, heat resistance and mold workability of the claimed invention (see item 3). To supplement the Examiner's position, he has included several passages from the Nakajima et al. reference to suggest features or hints for the optimization of result effect variables, as follows.

(1) the inclusion of another PGA layer or varying the thickness of said layer (paragraph [0081] of Nakajima et al., see item 3);

(2) a container of the desired size and the desired gas-barrier property (paragraph [0001] of the reference, see item 3);

(3) the availability of a cold or a hot parison method (paragraph [0148] of the reference, see item 3);

(4) the concentration of a compound to achieve a desired oxygen gas permeability (see item 12) (Applicants presume the Examiner is referring to “PGA” when discussing “a compound”); and

(5) the adjustment of the gas-barrier property by adjustment of the volume/surface space of a container, i.e. a larger volume of a container will result in more area (see item 12).

Applicants take the position that the Nakajima et al. reference provides no reason why the volume of the container and the weight content of the PGA of formula (2) would have been result effective variables, and that the claimed invention would not have been obvious over the reference.

The Presently Claimed Invention

The presently claimed invention is directed to a multilayer hollow container having an improved gas-barrier property, even at a small volume of 700 ml, by utilizing to the utmost the gas-barrier property of a single layer of a polyglycolic acid resin (PGA) in a co-stretched multilayer wall structure, which includes a single layer of PGA and a layer of co-laminated resin comprising an aromatic polyester resin (PET) or an aliphatic polyester resin (other than PGA) through blow molding by a cold parison method under optimum conditions to satisfy formula (2) of claim 3. In particular, the claimed invention prevents premature crystallization before the stretching of the PGA layer to achieve an optimum molecular orientation state of the PGA, and thus provide a maximum gas-barrier property, as discussed in the previous response.

The effect of the optimized conditions of the cold parison method is clear from a comparison of Examples 1-4 with Comparative Example 1, as shown in Table 1 of the specification. None of the above-mentioned features or hints (1) - (5) asserted by the Examiner were adopted in Examples 1-4 in order to achieve an improved (i.e., reduced) oxygen permeability and an improved (i.e., reduced) PGA performance factor ($T \times w/v$) as compared to those of Comparative Example 1.

Moreover, one of ordinary skill in the art would not have been motivated to optimize result effective variables to arrive at the gas-barrier multilayer hollow container of claim 3 in view of these five assertions and the Nakajima et al. reference.

Paragraph [0148] of the reference merely discloses the applicability of the cold parison method as an alternative to the hot parison method used in all of the reference's examples (Examples 1-3). The reference does not teach or suggest that using a cold parison method as a condition results in a superior and unexpected difference in the gas-barrier property of a container by the maximum utilization of the improved gas-barrier property of a single PGA layer.

Moreover, claim 3 recites "wherein the multilayer wall structure has been cooled once, re-heated and then co-stretched to satisfy formula (2), $(T \times w/v \leq 0.8 \times 10^{-3})$ (2), wherein T represents an oxygen gas permeability (ml/container/day/atm), v represents a volume (ml) of the container of at most 700 ml, and w represents a content (wt.%) of the polyglycolic acid resin of 1 - 10 wt.% with respect to a whole weight of the container. Accordingly, the PGA performance factor must satisfy formula (2) of claim 3.

" $T \times w$ " in formula (2) represents an oxygen permeation rate per PGA content, and a smaller value thereof means a more effective gas-barrier property exhibited by PGA. The coefficient " $1/v$ " represents a better gas-barrier property, even at a small volume, which is in resistance to the tendency for the contribution of the gas permeation wall area (proportional to a square of length) to be increased with a smaller container volume (proportional to a cube of length). Therefore, the requirement of formula (2), as recited in claim 3, represents a superior gas-barrier property per unit PGA content, even at a small container volume of at most 700 ml.

In this regard, Applicants note that " w " represents a thickness proportion of the PGA layer in the multilayer structure, rather than the PGA content in the PGA layer. Accordingly, an increase in thickness of the PGA layer (as suggested by the Examiner) increases " $T \times w$ " (i.e., it provides a worse gas-barrier performance), unless a corresponding decrease in gas permeability is attained.

As discussed in the previous response, the requirement of formula (2) represents a superior gas-barrier property per unit PGA content (PGA thickness proportion) even at a small container volume. This is an unexpected property that was discovered by Applicants. The appropriate setting conditions for the stretch blow molding according to the cold parison scheme are not taught or suggested by Nakajima et al., which teaches stretch blow molding according to the hot parison scheme. Accordingly, the reference's teaching of stretch blow molding according to the hot parison scheme would not have suggested the superior an unexpected gas-

barrier property obtained in the presently claimed invention and represented by formula (2).

Therefore, claim 3 would not have been obvious over the reference.

Claims 2, 4-8 and 17 depend directly or indirectly from claim 3, and thus also would not have been obvious over the reference.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

III. Conclusion

For these reasons, Applicants take the position that the presently claimed invention is clearly patentable over the applied reference.

Therefore, in view of the foregoing amendments and remarks, it is submitted that the rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

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